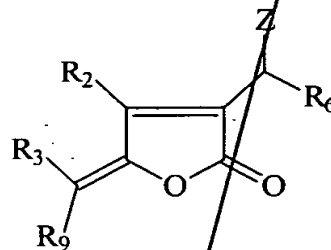


1. A compound according to formula (I):



(I)

wherein  $R_6$  is H, OH, alkyl, alkoxy, oxoalkyl, alkenyl, aryl or arylalkyl whether unsubstituted or substituted, straight chain or branched chain, hydrophobic, hydrophilic or fluorophilic;

$R_2$  and  $R_3$  are independently or both H or halogen;

$R_9$  is halogen;

Z is independently selected from the group  $R_6$ , halogen, OOH,  $OC(O)R_6$ , = O, amine, azide, thiol, mercaptoalkyl, alkenyloxy, mercaptoalkenyl, aryloxy, mercaptoaryl, arylalkyloxy, mercaptoarylalkyl,  $SC(O)R_6$ ,  $OS(O)R_6$ ,  $OS(O)_2R_6$ ,  $NHC(O)R_6 = NR_4$  or  $NHR_4$ ; and

$R_4$  is OH, alkyl, alkoxy, poly(ethylene glycol), alkenyl, aryl or arylalkyl. provided that:

when  $R_6$  is propyl,  $R_2$  is Br,  $R_3$  is H or Br and  $R_9$  is Br, then Z is other than H,  $OC(O)CH_3$  or OH;

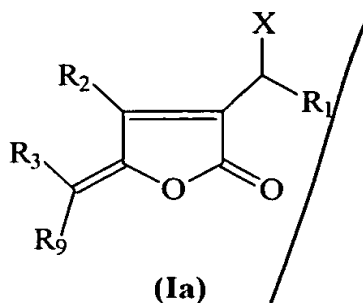
when  $R_6$  is propyl,  $R_2$  is Br,  $R_3$  is H and  $R_9$  is I, then Z is other than  $OC(O)CH_3$  or OH;

when  $R_6$  is propyl,  $R_2$  is Br,  $R_3$  is H and  $R_9$  is Cl, then Z is other than OH;

when  $R_6$  is propyl,  $R_2$  is H,  $R_3$  and  $R_9$  are Br, then Z is other than H; and

when  $R_6$  is propyl,  $R_2$  is Br,  $R_9$  is Cl and Z is H, then  $R_3$  is other than Cl.

2. A compound according to claim 1 of formula (Ia):



(Ia)

wherein R<sub>1</sub> is hydrogen, alkyl, alkoxy, oxoalkyl, alkenyl, aryl or arylalkyl whether unsubstituted or substituted, straight chain or branched chain, hydrophobic, hydrophilic or fluorophilic;

X is a halogen, OH, OOH, OC(O)R<sub>1</sub> or =O;

R<sub>2</sub> and R<sub>3</sub> are independently or both hydrogen or halogen; and

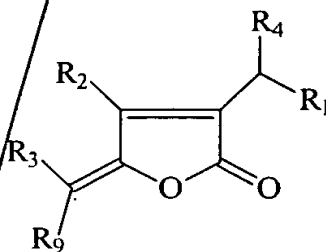
R<sub>9</sub> is halogen, provided that:

when R<sub>1</sub> is propyl, R<sub>2</sub> is Br, R<sub>3</sub> is H or Br and R<sub>9</sub> is Br, then X is other than OC(O)CH<sub>3</sub> or OH;

when R<sub>1</sub> is propyl, R<sub>2</sub> is Br, R<sub>3</sub> is H and R<sub>9</sub> is I, then X is other than OC(O)CH<sub>3</sub> or OH;

when R<sub>1</sub> is propyl, R<sub>2</sub> is Br, R<sub>3</sub> is H, R<sub>9</sub> is Cl, then X is other than OH.

3. A compound according to claim 1 of formula (II):



(II)

wherein R<sub>1</sub> is hydrogen, unsubstituted or substituted, straight chain or branched chain, hydrophobic, hydrophilic or fluorophilic alkyl, alkoxy, oxoalkyl, alkenyl, aryl or arylalkyl;

R<sub>2</sub> and R<sub>3</sub> are independently or both hydrogen or halogen;

R<sub>9</sub> is halogen; and

R<sub>4</sub> is selected from the group halogen, amine, azide, hydroxyl, thiol, or any hydrophobic, hydrophilic or fluorophilic alkyl, alkoxy, mercaptoalkyl,

alkenyloxy, mercaptoalkenyl, aryloxy, mercaptoaryl, arylalkyloxy, mercaptoarylalkyl,  $\text{OC(O)R}_1$ ,  $\text{SC(O)R}_1$ ,  $\text{OS(O)R}_1$ ,  $\text{OS(O)}_2\text{R}_1$ ,  $\text{NHC(O)R}_1$ ,  $\text{OC(O)NHR}_1$ , or  $=\text{O}$ , provided that:

when  $\text{R}_4$  is propyl,  $\text{R}_2$  is Br,  $\text{R}_3$  is H or Br, and  $\text{R}_9$  is Br, then  $\text{R}_1$  is other than H,  $\text{OC(O)CH}_3$  or OH;

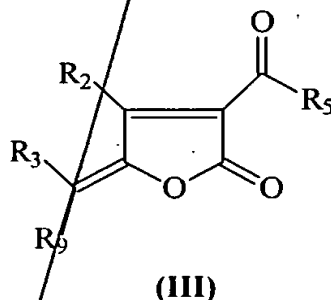
when  $\text{R}_4$  is propyl,  $\text{R}_2$  is Br,  $\text{R}_3$  is H,  $\text{R}_9$  is I, then  $\text{R}_1$  is other than  $\text{OC(O)CH}_3$  or OH;

when  $\text{R}_4$  is propyl,  $\text{R}_2$  is Br,  $\text{R}_3$  is H,  $\text{R}_9$  is Cl, then  $\text{R}_1$  is other than OH;

when  $\text{R}_4$  is propyl,  $\text{R}_2$  is H,  $\text{R}_3$  and  $\text{R}_9$  are Br, then  $\text{R}_1$  is other than H;

when  $\text{R}_4$  is propyl,  $\text{R}_2$  is Br,  $\text{R}_3$  and  $\text{R}_9$  are Cl, then  $\text{R}_1$  is other than H.

4. A compound according to claim 1 of formula (III):



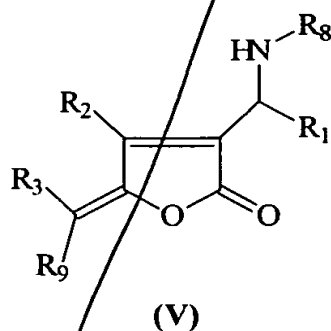
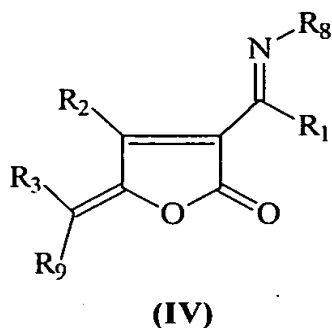
wherein  $\text{R}_2$  and  $\text{R}_3$  are independently or both hydrogen or halogen;

$\text{R}_5$  is OH or the same as  $\text{R}_1$ ;

$\text{R}_9$  is halogen; and

$\text{R}_1$  is hydrogen, alkyl, alkoxy, oxoalkyl, alkenyl, aryl or arylalkyl whether unsubstituted or substituted, straight chain or branched chain, hydrophobic, hydrophilic or fluorophilic.

5. A compound according to claim 1 of formula (IV) or (V):



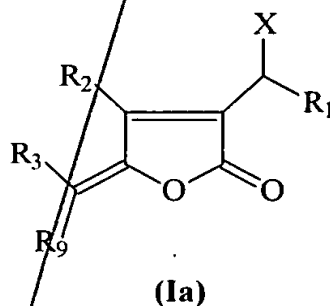
wherein  $R_1$  is hydrogen, alkyl, alkoxy, oxoalkyl, alkenyl, aryl or arylalkyl whether unsubstituted or substituted, straight chain or branched chain, hydrophobic, hydrophilic or fluorophilic;

$R_2$  and  $R_3$  are independently or both hydrogen or halogen;

$R_9$  is halogen and

$R_8$  is OH,  $NHR_1$ ,  $NHC(X)NH_2$ ,  $NHC(X)NHR_1$  ( $X=O, S, NR_1$ ) or any  $R_1$ .

6. A method for forming a fimbrolide derivative, the method including reacting a fimbrolide with a halogenating agent and/or an oxygenating agent to form compounds with formula (Ia):



wherein  $R_1$  is hydrogen, alkyl, alkoxy, oxoalkyl, alkenyl, aryl or arylalkyl whether unsubstituted or substituted, straight chain or branched chain, hydrophobic, hydrophilic or fluorophilic;

$X$  is a halogen ( $X = F, Cl, Br$  or  $I$ ), OH, OOH,  $OC(O)R_1$  or  $=O$ );

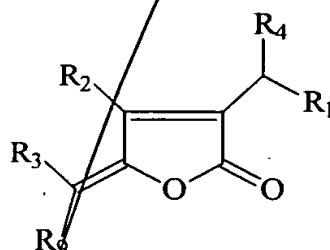
$R_2$  and  $R_3$  are independently or both hydrogen or halogen; and

$R_9$  is halogen.

7. A method according to claim 6 wherein the halogenating agent is selected from the group N-bromosuccinimide, N-chlorosuccinimide, N-iodosuccinimide, bromine, cupric bromide, and phenyltrimethylammonium perbromide.

8. A method according to claim 6 wherein the oxygenating agent is selected from lead tetraacetate, Rose Bengal/oxygen gas, hydrogen peroxide/vanadium pentoxide, selenium dioxide, and 3-chloroperoxybenzoic acid.

9. A method for forming a fimbrolide derivative, the method including displacement and/or functionalisation of the halogen or oxygen substituent in the fimbrolide side chain by treating with a nucleophile or an electrophile to form compounds with formula (II):



(II)

wherein R<sub>1</sub> is hydrogen, alkyl, alkoxy, oxoalkyl, alkenyl, aryl or arylalkyl whether unsubstituted or substituted, straight chain or branched chain, hydrophobic, hydrophilic or fluorophilic;

R<sub>2</sub> and R<sub>3</sub> are independently or both hydrogen or halogen;

R<sub>4</sub> is halogen; and

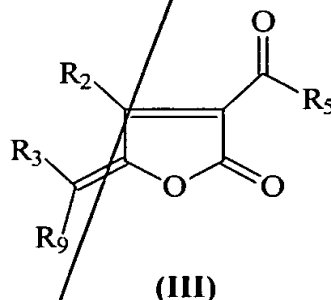
R<sub>4</sub> is selected from the group halogen, amine, azide, hydroxyl, thiol, or any hydrophobic, hydrophilic or fluorophilic alkyl, alkoxy, mercaptoalkyl, alkenyloxy, mercaptoalkenyl, aryloxy, mercaptoaryl, arylalkyloxy, mercaptoarylalkyl, OC(O)R<sub>1</sub>, SC(O)R<sub>1</sub>, OS(O)R<sub>1</sub>, OS(O)<sub>2</sub>R<sub>1</sub>, NHC(O)R<sub>1</sub>, OC(O)NHR<sub>1</sub>, or =O provided that when R<sub>4</sub> is propyl, R<sub>2</sub> is Br, R<sub>3</sub> and R<sub>4</sub> are Cl, then R<sub>1</sub> is other than H.

10. A method according to claim 9 wherein the nucleophile is selected from metal halides, water, organic metal carboxylate, organic alcohols, dimethyl sulfoxide, and organonitrile/acid catalyst, and silver triflate.

5 11. A method according to claim 9 wherein the electrophile is selected from organic acids, isocyanates, acid halides or active acylating agents such as carbonyl imidazoles or anhydrides (including activated hydrophilic PEG acids, PEG acid chlorides, PEG-oxycarbonylimidazoles and PEG-isocyanates) organic sulfonyl chlorides, and diethylaminosulfur trifluoride.

10

12. A method for forming a fimbrolide derivative the method including reacting an hydroxyl substituent in the fimbrolide side chain with an oxidising agent to form a compound in accordance with formula (III):



15

wherein  $R_2$  and  $R_3$  are independently or both hydrogen or halogen;

$R_5$  is OH or the same as  $R_1$ ;

$R_9$  is halogen; and

20

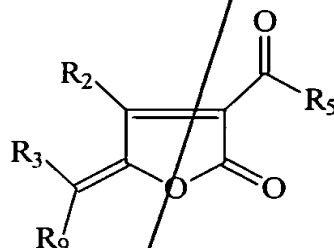
$R_1$  is hydrogen, alkyl, alkoxy, oxoalkyl, alkenyl, aryl or arylalkyl whether unsubstituted or substituted, straight chain or branched chain, hydrophobic, hydrophilic or fluorophilic.

25

13. A method according to claim 12 wherein the oxidising agents is selected from the group consisting of acid dichromate reagents in any form which may be free or polymer supported, chromium trioxide, manganese dioxide, potassium permanganate, selenium dioxide, ceric ammonium nitrate, ruthenium tetroxide, and hot nitric acid.

14. A method according to claim 13 wherein the acid dichromate agent is selected from the group consisting of Jones reagent, pyridinium chlorochromate, pyridinium dichromate.

15. A method for forming a fimbrolide analogue derived from a compound of formula (III)



(III)

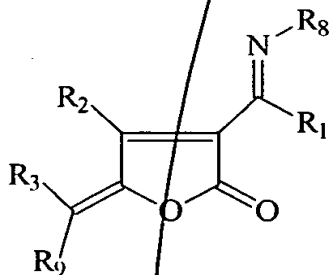
wherein R<sub>2</sub> and R<sub>3</sub> are independently or both hydrogen or halogen;

R<sub>5</sub> is OH or the same as R<sub>1</sub>;

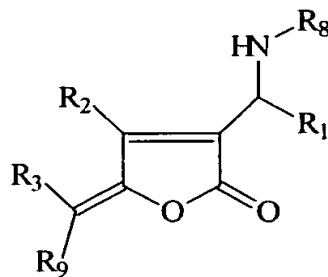
R<sub>9</sub> is halogen; and

R<sub>1</sub> is hydrogen, alkyl, alkoxy, oxoalkyl, alkenyl, aryl or arylalkyl whether unsubstituted or substituted, straight chain or branched chain, hydrophobic, hydrophilic or fluorophilic,

the method including reacting an aldehyde or ketone substituent in the fimbrolide side chain of the compound with an amine derivative to form a compound with formula (IV) or (V):



(IV)



(V)

wherein  $R_1$  is hydrogen, alkyl, alkoxy, oxoalkyl, alkenyl, aryl or arylalkyl whether unsubstituted or substituted, straight chain or branched chain, hydrophobic, hydrophilic or fluorophilic;

$R_2$  and  $R_3$  are independently or both hydrogen or halogen;

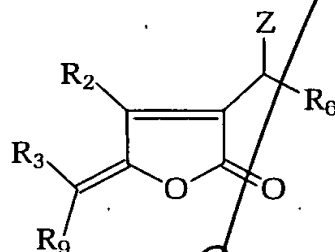
5  $R_9$  is halogen and

$R_8$  is OH,  $NHR_1$ ,  $NHC(X)NH_2$ ,  $NHC(X)NHR_1$  ( $X=O, S, NR_1$ ) or any  $R_1$ .

16. A method according to claim 15 wherein the amine derivative is selected from the group hydroxyl amine hydrochloride, alkyl and aryl hydrazines, alkyl or aryl amine optionally in the presence of a reducing agent.

17. A fimbrolide derivative produced by a method in accordance with any one of claims 6 to 16.

18. An oligomer or polymer formed by oligomerisation or polymerisation of a fimbrolide compound of the formula:



10

wherein  $R_6$  is H, OH, alkyl, alkoxy, oxoalkyl, alkenyl, aryl or arylalkyl ~~whether unsubstituted or substituted, straight chain or branched chain, hydrophobic, hydrophilic or fluorophilic;~~

15  $R_2$  and  $R_3$  are independently or both H or halogen;

$R_9$  is halogen;

Z is independently selected from the group  $R_6$ , halogen, OOH,  $OC(O)R_6$ , = O, amine, azide, thiol, mercaptoalkyl, alkenyloxy, mercaptoalkenyl, aryloxy, mercaptoaryl, arylalkyloxy, mercaptoarylalkyl,

20  $SC(O)R_6$ ,  $OS(O)R_6$ ,  $OS(O)_2R_6$ ,  $NHC(O)R_6 = NR_4$  or  $NHR_4$ ; and

$R_4$  is OH, alkyl, alkoxy, poly(ethylene glycol), alkenyl, aryl or arylalkyl,



optionally with at least one other monomer.

19. A polymer according to claim 18 wherein the polymer is a homopolymer of the fimbrolide compound of claim 18.

20. A polymer according to claim 18 wherein the polymer is a copolymer of at least one fimbrolide compound in accordance with claim 18 and at least one other polymerisable monomers. *comprises*

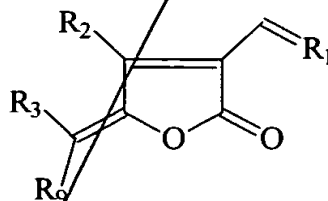
21. Use of a compound in accordance with any one of claims 1 to 5 or 17 as antimicrobial, antiseptic, microbacterial static and/or antifouling agent.

22. An antimicrobial, antiseptic and/or microbacterial static composition including at least one compound in accordance with claims 1 to 5 or 17, or an oligomer or polymer according to any one of claims 18 to 20.

23. An antifouling composition including at least one compound in accordance with claims 1 to 5 or 17, or an oligomer or polymer according to any one of claims 18 to 20.

24. A surface coating composition incorporating at least one compound in accordance with claims 1 to 5 or 17 or an oligomer or polymer according to any one of claims 18 to 20.

25. A compound of formula (VI):



(VI)

wherein R<sub>1</sub> is alkyl, alkoxy, oxoalkyl, alkenyl, aryl or arylalkyl unsubstituted or substituted, straight chain or branched chain, hydrophobic, hydrophilic or fluorophilic;

R<sub>2</sub> and R<sub>3</sub> are independently or both hydrogen or halogen; and  
R<sub>9</sub> is halogen.

26. A compound according to claim 25 which is 4-Bromo-5-(bromomethylene)-3-(1-butenyl)-2(5H)-furanone.

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